Consciousness

Chapter 4

SHOUT
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IT

Chapter 4 Learning Objective Menu

- LO 4.1 Consciousness and levels of consciousness
- LO 4.2 Why sleep and how sleep works
- LO 4.3 Purpose of sleep
- LO 4.4 Stages of sleep
- LO 4.5 Dreaming and what happens if people do not dream
- LO 4.6 Sleepwalking as a defense for committing a crime
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- LO 4.13 Alcohol and its dangers
- LO 4.14 Narcotics and why they are so addictive
- LO 4.15 How hallucinogens work
- LO 4.16 Marijuana and its risks
- LO 4.17 Sleep deprivation

Consciousness

- Consciousness - a person's awareness of everything that is going on around him or her at any given moment.
- Waking consciousness - state in which thoughts, feelings, and sensations are clear, organized, and the person feels alert.
- Altered state of consciousness - state in which there is a shift in the quality or pattern of mental activity as compared to waking consciousness.

Menu

Necessity of Sleep

- Circadian rhythm - a cycle of bodily rhythm that occurs over a 24-hour period.
  - "circa" – about
  - "diem" – day
- Hypothalamus – tiny section of the brain that influences the glandular system.
  - suprachiasmatic nucleus – deep within the hypothalamus; the internal clock that tells people when to wake up and when to fall asleep.
    - Tells pineal gland to secrete melatonin, which makes a person feel sleepy.

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Necessity of Sleep

- Microsleeps - brief sidesteps into sleep lasting only a few seconds.
- Sleep deprivation - any significant loss of sleep, resulting in problems in concentration and irritability.

Microsleeps are a common cause of accidents while driving. If this woman continues to drive while she is this sleepy, she may fall asleep at the wheel for only a few moments. Those few moments can mean disaster—for her and for others on the road with her.

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Necessity of Sleep

- Adaptive theory - theory of sleep proposing that animals and humans evolved sleep patterns to avoid predators by sleeping when predators are most active.

This tree-dwelling loris, like most nocturnal animals, has very large eyes. The adaptive theory of sleep assumes that animals in danger from predators tend to sleep at night. With its nightly activities confined safely to the trees, the loris has no need to fear predators at night and instead sleeps during the day.

These lionesses are predators and have no need to sleep at night to protect themselves. They sleep and hunt on and off during the day in perfect safety, while the animals that the lionesses prey upon sleep at night in the safety of dens or other shelter.

- Restorative theory - theory of sleep proposing that sleep is necessary to the physical health of the body and serves to replenish chemicals and repair cellular damage.

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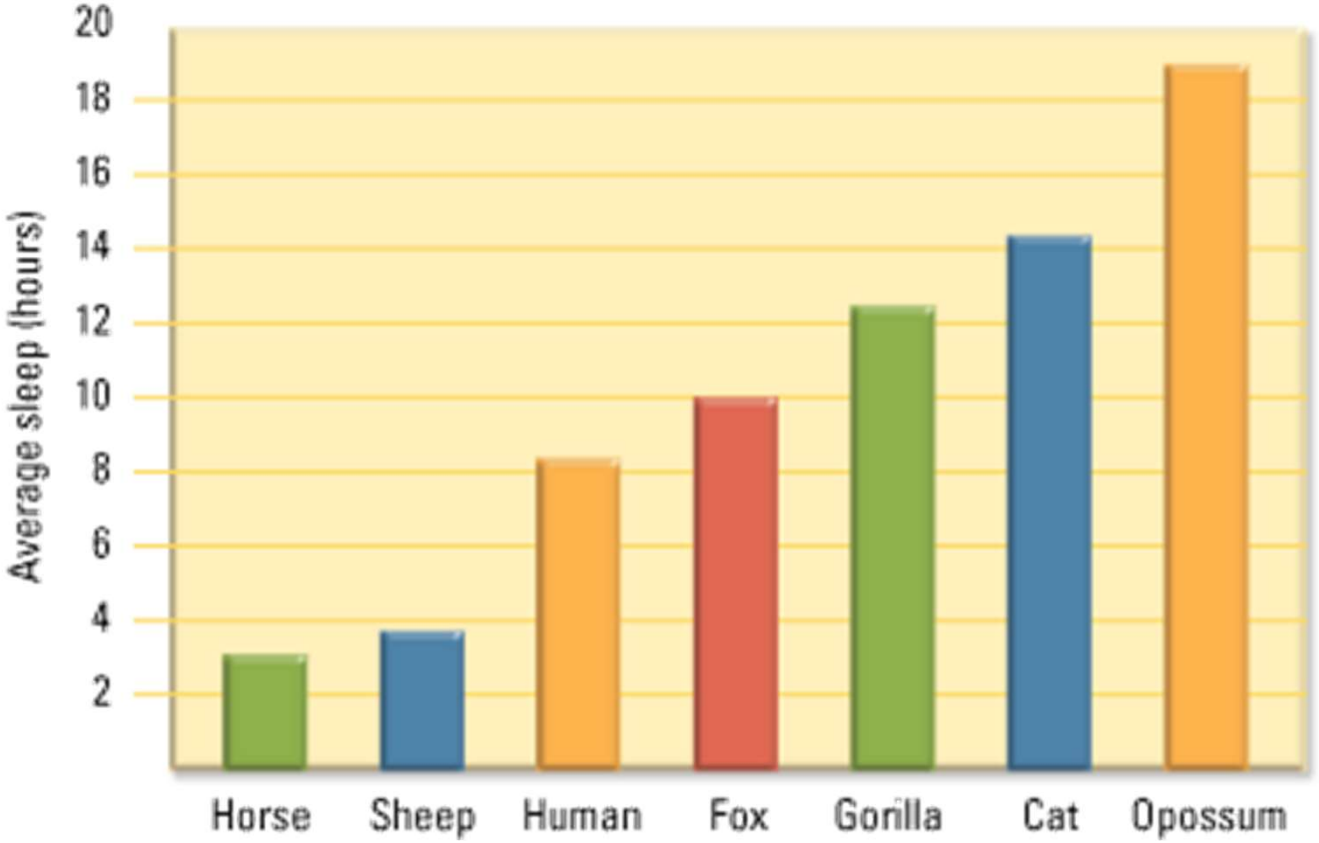
LO 4.3 Purposes of sleep



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Brain Wave Patterns

- Electroencephalograph (EEG) - allows scientists to see the brain wave activity as a person passes through the various stages of sleep and to determine what type of sleep the person has entered.
  - Alpha waves - brain waves that indicate a state of relaxation or light sleep.
  - Theta waves - brain waves indicating the early stages of sleep.
  - Delta waves - long, slow waves that indicate the deepest stage of sleep.

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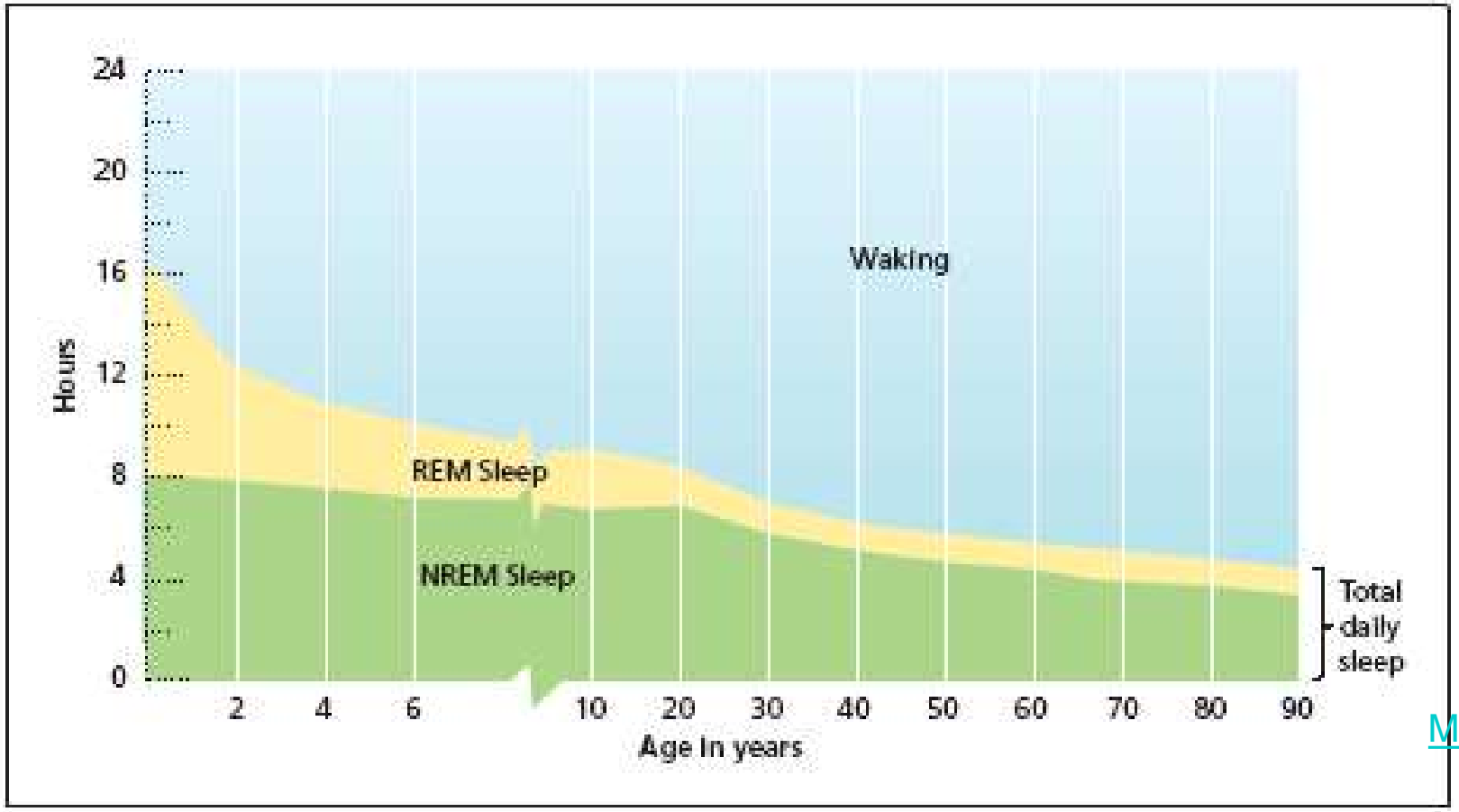
LO 4.4 Stages of sleep

FIGURE 4.1 **Sleep Patterns of Infants and Adults** Infants need far more sleep than older children and adults. Both REM sleep and NREM sleep decrease dramatically in the first ten years of life, with the greatest decrease in REM sleep. Nearly 50 percent of an infant's sleep is REM, compared to only about 20 percent for a normal, healthy adult.
(Roffwarg, 1966)



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Stages of Sleep

- Rapid eye movement (REM) - stage of sleep in which the eyes move rapidly under the eyelids and the person is typically experiencing a dream.
- NREM (non-REM) sleep - any of the stages of sleep that do not include REM.

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Stages of Sleep

- Non-REM Stage One – light sleep.
  - May experience:
  - hypnagogic images – vivid visual events.
  - hypnic jerk – knees, legs, or whole body jerks.
- Non-REM Stage Two – sleep spindles (brief bursts of activity only lasting a second or two).
- Non-REM Stages Three and Four – delta waves pronounced.
  - Deep sleep – when 50%+ of waves are delta waves.

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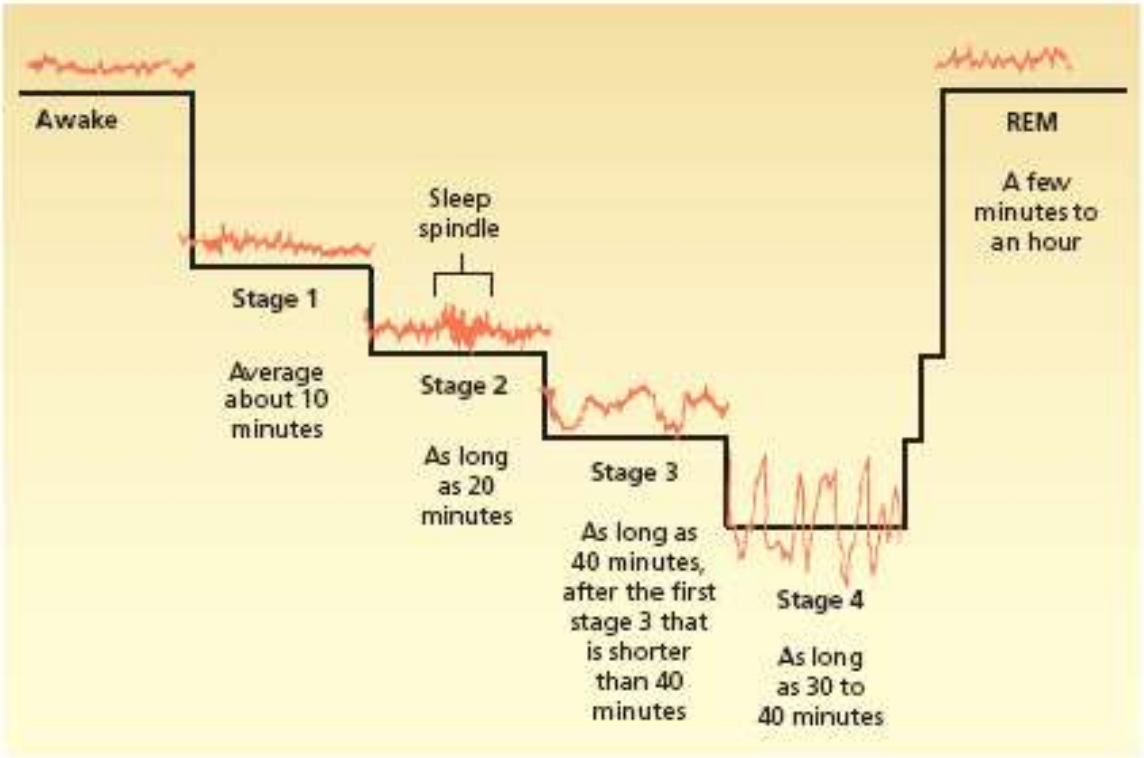
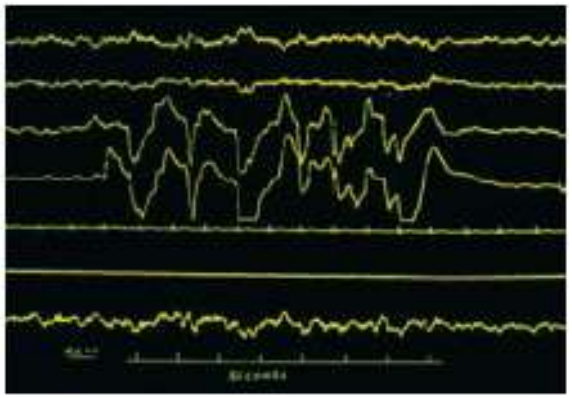
FIGURE 4.2 **8-hour sleep cycle** (a) The four stages of sleep and REM sleep comprise the sleep cycle, repeated four or five times during a single night's sleep. A normal sleep cycle takes an average of an hour and a half, with Stage Four being longer in the beginning of the night and REM sleep being longer in the last part of the sleep period, just before awakening. (b) This EEG shows brain activity (bottom line) during REM sleep. The larger graphs in the middle (third and fourth from the top) show muscle activity, which is much slower during REM sleep and accounts for the larger, slower waves on these graphs.

LO 4.4 Stages of sleep

a.


Awake
Stage 1
Average about 10 minutes
Sleep spindle
Stage 2
As long as 20 minutes
Stage 3
As long as 40 minutes, after the first stage 3 that is shorter than 40 minutes
Stage 4
As long as 30 to 40 minutes
REM
A few minutes to an hour

b.



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LO 4.4 Stages of sleep

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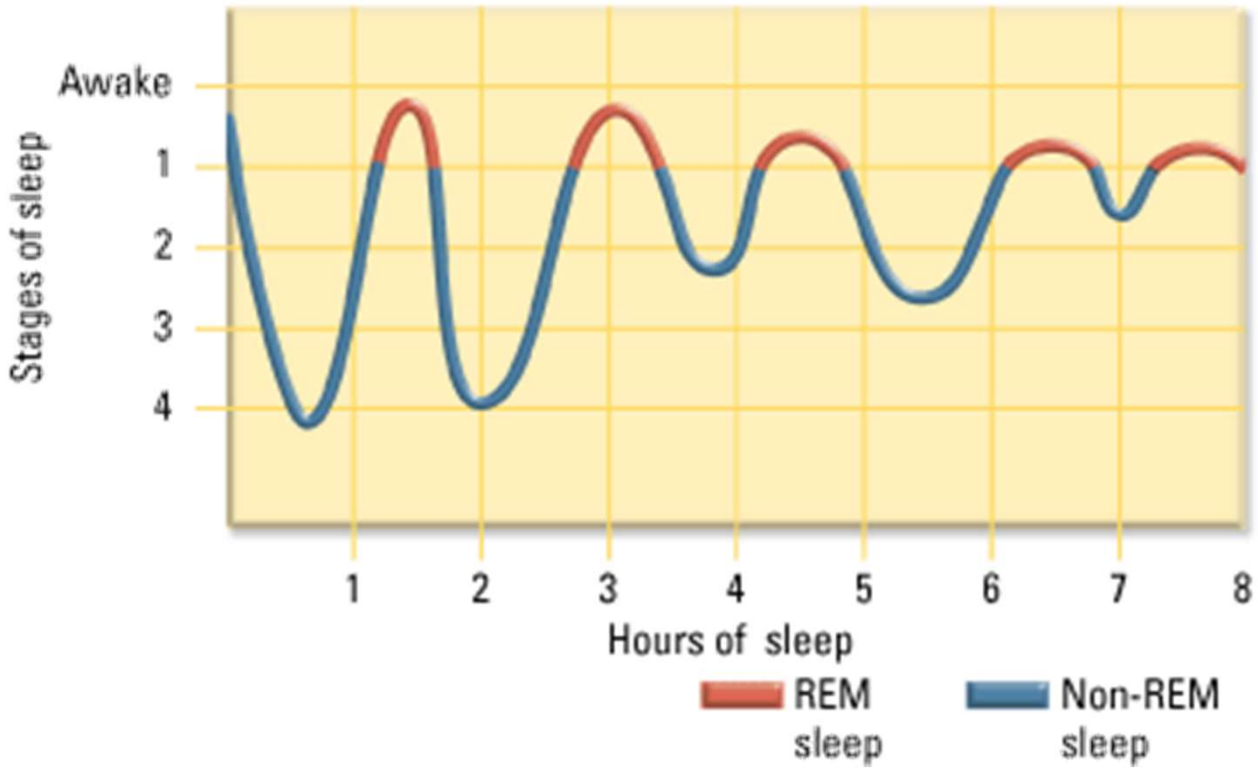
LO 4.4 Stages of sleep



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Stage Four Sleep Disorders

- Sleepwalking (somnambulism) - occurring during deep sleep, an episode of moving around or walking around in one's sleep.
- Night terrors - relatively rare disorder in which the person experiences extreme fear and screams or runs around during deep sleep without waking fully.

Sleepwalking is more common among children than adults. Although this young girl may appear to be awake, she is still deeply asleep. When she awakens in the morning, she will have no memory of this sleepwalking episode.

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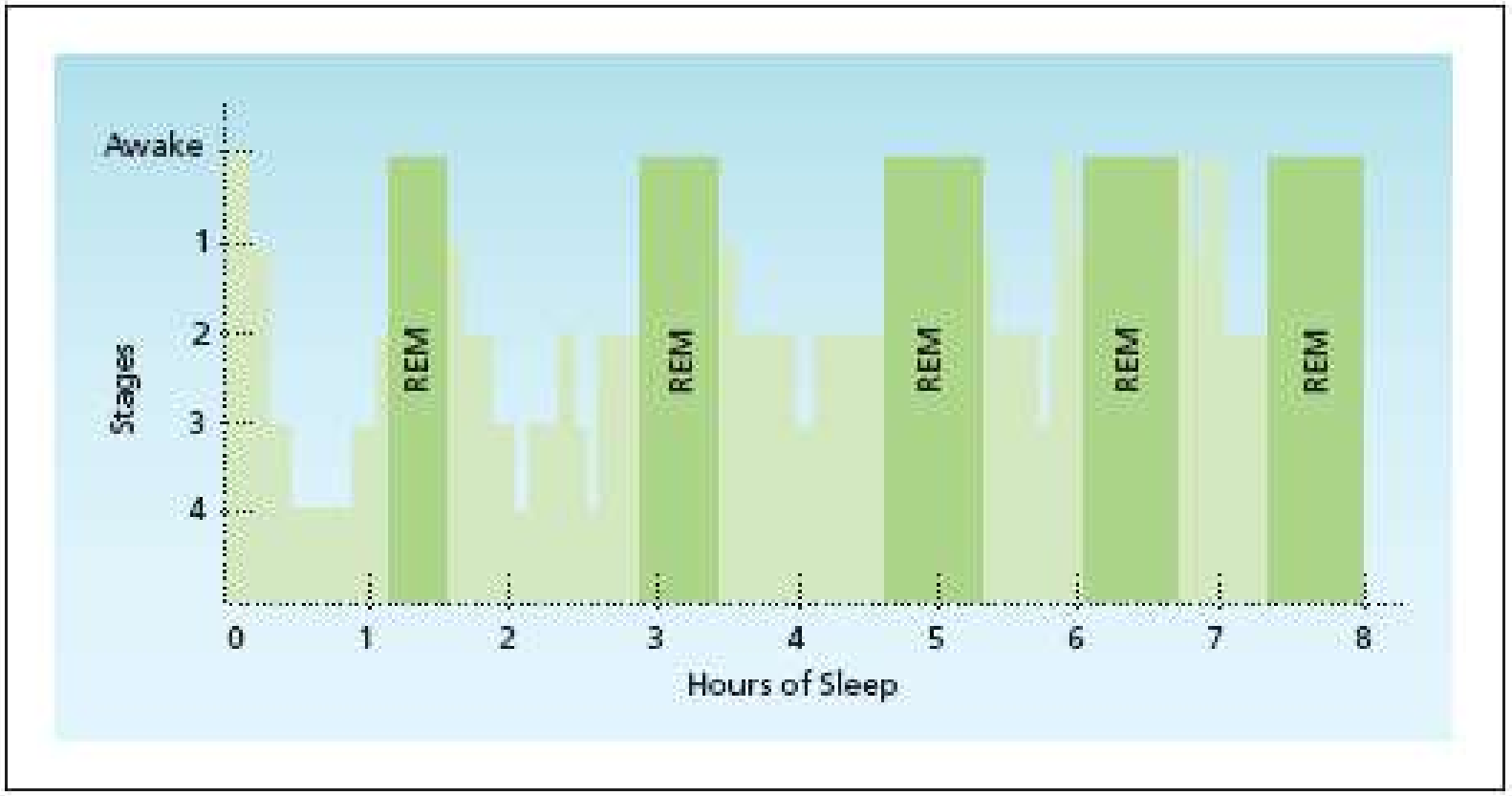
LO 4.4 Stages of sleep

FIGURE 4.3
The graph shows the typical progression through the night of Stages 1–4 and Stage 1 REM sleep. Stage 1–4 are indicated on the x-axis, and REM stages are represented by darker bars on the graph. The REM periods occur about every 90 minutes throughout the night. (Dement, 1974)



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REM Sleep and Dreaming

- REM sleep is paradoxical sleep (high level of brain activity).
- If wakened during REM sleep, almost always report a dream.
- REM rebound - increased amounts of REM sleep after being deprived of REM sleep on earlier nights.
- Nightmares - bad dreams occurring during REM sleep.
- REM behavior disorder - a rare disorder in which the mechanism that blocks the movement of the voluntary muscles fails, allowing the person to thrash around and even get up and act out nightmares.

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Can Sleepwalking be a Crime Defense?

- Steven Steinberg case
- Kenneth Parks case
- Scott Falater case

Scott Falater testifies at his trial for the murder of his wife, which he claims he committed while he was sleepwalking.

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Problems During Sleep

- Insomnia - the inability to get to sleep, stay asleep, or get a good quality of sleep.
- Sleep apnea - disorder in which the person stops breathing for nearly half a minute or more.
  - Continuous positive airway pressure device.
- Narcolepsy - sleep disorder in which a person falls immediately into REM sleep during the day without warning.
  - Cataplexy – sudden loss of muscle tone.

"On your application it says you have narcolepsy. What is that?"

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TABLE 4.1 COMMON SLEEP DISORDERS

Name of Disorder	Primary Symptoms
Somnambulism	Sitting, walking, or performing complex behavior while asleep
Night terrors	Extreme fear, agitation, screaming while asleep
Restless leg syndrome	Uncomfortable sensations in legs causing movement and loss of sleep
Nocturnal leg cramps	Painful cramps in calf or foot muscles
Hypersomnia	Excessive daytime sleepiness
Circadian rhythm disorders	Disturbances of the sleep–wake cycle such as jet lag and shift work
Enuresis	Urinating while asleep in bed

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LO 4.8 Why people dream and what they dream about

Dreams

- Freud – dreams as wish fulfillment.
  - Manifest content – the actual dream itself.
  - Latent content – the true, hidden meaning of a dream.
- Activation-synthesis hypothesis - explanation that states that dreams are created by the higher centers of the cortex to explain the activation by the brain stem of cortical cells during REM sleep periods.
- Activation-information-mode model (AIM) - revised version of the activation-synthesis explanation of dreams in which information that is accessed during waking hours can have an influence on the synthesis of dreams.

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Hypnosis

- Hypnosis - state of consciousness in which the person is especially susceptible to suggestion.
- Four Elements of Hypnosis:

1. The hypnotist tells the person to focus on what is being said.
2. The person is told to relax and feel tired.
3. The hypnotist tells the person to "let go" and accept suggestions easily.
4. The person is told to use vivid imagination.

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Hypnotic susceptibility – degree to which a person is a good hypnotic subject.

TABLE 4.2 SAMPLE ITEMS FROM THE STANFORD HYPNOTIC SUSCEPTIBILITY SCALE: FORM C (SHSS:C)

Hand lowering	Postural sway
Moving hands apart	Closing eyes
Taste hallucination	Finger lock
Arm rigidity	Hands moving together
Age regression	Cannot say one's name
Hallucinated voice	Visual hallucination
Amnesia	Cannot open eyes

Source: Adapted from Hilgard, E. (1965). Hypnotic Susceptibility. New York: Harcourt, Brace & World.

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LO 4.9 Hypnosis and how it works

TABLE 4.3 FACTS ABOUT HYPNOSIS

Hypnosis Can:	Hypnosis Cannot:
Create amnesia for whatever happens during the hypnotic session, at least for a brief time (Bowers & Woody, 1996).	Give people superhuman strength. (People may use their full strength under hypnosis, but it is no more than they had before hypnosis.)
Relieve pain by allowing a person to remove conscious attention from the pain (Holroyd, 1996).	Reliably enhance memory. (There's an increased risk of false memory retrieval because of the suggestible state hypnosis creates.)
Alter sensory perceptions. (Smell, hearing, vision, time sense, and the ability to see visual illusions can all be affected by hypnosis.)	Regress people back to childhood. (Although people may act like children, they do and say things children would not.)

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Theories of Hypnosis

- Hypnosis as dissociation – hypnosis works only in a person's immediate consciousness, while a hidden "observer" remained aware of all that was going on.
- Social-cognitive theory of hypnosis - theory that assumes that people who are hypnotized are not in an altered state but are merely playing the role expected of them in the situation.

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Psychoactive Drugs

- Psychoactive drugs - drugs that alter thinking, perception, and memory.
- Physical Dependence
  - Tolerance – more and more of the drug is needed to achieve the same effect.
  - Withdrawal - physical symptoms that can include nausea, pain, tremors, crankiness, and high blood pressure, resulting from a lack of an addictive drug in the body systems.
- Psychological dependence - the feeling that a drug is needed to continue a feeling of emotional or psychological well-being.

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Stimulants

- Stimulants - drugs that increase the functioning of the nervous system.
  - Amphetamines – drugs that are synthesized (made in labs) rather than found in nature.
  - Cocaine – natural drug; produces euphoria, energy, power, and pleasure.

One of the dangers of psychoactive drugs is that they may lead to physical or psychological dependence. Cocaine is a powerful and addictive stimulant and can be sniffed in through the nose or injected, as the man in this photograph is doing.

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Stimulants

- Nicotine - active ingredient in tobacco.
- Caffeine - the stimulant found in coffee, tea, most sodas, chocolate, and even many over-the-counter drugs.

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LO 4.11 Stimulants

If you are pregnant, give your baby a good start:
DON'T DRINK
DON'T SMOKE
DON'T TAKE DRUGS
Don't take any medicines without your doctor's okay.
NEW
Taurine
Fortification
Of All
Ross Laboratories
Infant Formulas...
A significant advance in our quest to produce infant formulas that perform closest to mother's milk
SIMILAC and ISOMIL

The harmful effects of nicotine are now well known, but many people continue to smoke or chew tobacco in spite of warnings such as this one cautioning pregnant women not to smoke. The nicotine patch this man is placing on his upper arm will deliver a controlled dose of nicotine throughout the time he is wearing it to prevent the physical craving for the drug. As he continues to move to smaller doses, his addiction will lessen and eventually disappear.

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TABLE 4.4 AVERAGE CAFFEINE CONTENT OF SOME COMMON FOODS

Product (8 oz. except as noted)	Caffeine (milligrams)
Brewed coffee	60–120
Decaffeinated coffee	2–4
Espresso/cappuccino (1 oz.)	30–50
Tea brewed 1 minute	9–33
Tea brewed 3 minutes	20–46
Tea brewed 5 minutes	20–50
Iced tea (8 oz./12 oz.)	15–24/22–36
Hot cocoa	3–32
Milk chocolate (1 oz.)	1–15
Dark chocolate (1 oz.)	5–35
Jolt soda (8 oz./12 oz.)	47/71
Mountain Dew (8 oz./12 oz.)	36/54
Coca-Cola (8 oz./12 oz.)	31/46
Pepsi (8 oz./12 oz.)	24/36

Source: Barone, J. J., & Roberts, H. R. (1996). Caffeine consumption. *Food Chemistry and Toxicology, 34*, 119–129.

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Depressants

- Depressants - drugs that decrease the functioning of the nervous system.
  - Barbituates – depressant drugs that have a sedative effect.
  - Benzodiazepines - drugs that lower anxiety and reduce stress.

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Alcohol

- Alcohol - the chemical resulting from fermentation or distillation of various kinds of vegetable matter.
  - Often confused as a stimulant but actually a depressant on CNS.

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LO 4.13 Alcohol

TABLE 4.5 BLOOD ALCOHOL LEVEL AND BEHAVIOR ASSOCIATED WITH AMOUNTS OF ALCOHOL

A drink is a drink. Each contains half an ounce of alcohol.
So a drink is . . .

- 1 can of beer (12 oz. 4–5% alcohol)
- 1 glass of wine (4 oz. 12% alcohol)
- 1 shot of most liquors (1 oz. 40–50% alcohol)

At times "a drink" is really the equivalent of more than just one drink, like when you order a drink with more than one shot of alcohol in it, or you do a shot followed by a beer.

Average Number of Drinks	Blood Alcohol Level	Behavior
1–2 drinks	.05%	Feeling of well being Release of inhibitions Judgment impaired Coordination and level of alertness lowered Increase risk of collision while driving
3–5 drinks	.10%	Reaction time significantly slowed Muscle control and speech impaired Limited night and side vision Loss of self-control Crash risk greatly increased
6–7 drinks	.15%	Consistent and major increases in reaction time
8–10 drinks	.20%	Loss of equilibrium and technical skills Sensory and motor capabilities depressed Double vision and legal blindness (20/20) Unfit to drive for up to 10 hours
10–14 drinks	.20% and .25%	Staggering and severe motor disturbances
10–14 drinks	.30%	Not aware of surroundings
10–14 drinks	.35%	Surgical anesthesia Lethal dosage for a small percentage of people
14–20 Drinks	.40%	Lethal dosage for about 50% of people Severe circulatory/respiratory depression Alcohol poisoning/overdose

Source: Adapted from the *"Moderate Drinking Skills Study Guide."* (2004). Eau-Claire, WI: University of Wisconsin.

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Narcotics

- Narcotics - a class of opium-related drugs that suppress the sensation of pain by binding to and stimulating the nervous system's natural receptor sites for endorphins.
  - Opium - substance derived from the opium poppy from which all narcotic drugs are derived.
  - Morphine - narcotic drug derived from opium, used to treat severe pain.
  - Heroin - narcotic drug derived from opium that is extremely addictive.

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Hallucinogens

- Psychogenic drugs - drugs including hallucinogens and marijuana that produce hallucinations or increased feelings of relaxation and intoxication.
  - Hallucinogens - drugs that cause false sensory messages, altering the perception of reality.
  - LSD (lysergic acid diethylamide) - powerful synthetic hallucinogen.
  - PCP - synthesized drug now used as an animal tranquilizer that can cause stimulant, depressant, narcotic, or hallucinogenic effects.

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Hallucinogens

- MDMA (Ecstasy or X) - designer drug that can have both stimulant and hallucinatory effects.
- Stimulatory hallucinogenics – drugs that produce a mixture of psychomotor stimulant and hallucinogenic effects.
- Mescaline - natural hallucinogen derived from the peyote cactus buttons.
- Psilocybin - natural hallucinogen found in certain mushrooms.

Many of these young people enjoying themselves at a rave may be using MDMA, or Ecstasy. The dehydrating effect of the drug, together with the intense dancing and physical activity at raves like this one, can have a deadly effect on the user.

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Marijuana

- Marijuana (pot or weed) - mild hallucinogen derived from the leaves and flowers of a particular type of hemp plant.

This woman is preparing a cannabis (marijuana) cigarette. Cannabis is reported to relieve pain in cases of multiple sclerosis and chronic pain from nerve damage. Such use is controversial as cannabis is classified as an illegal drug in some countries.

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TABLE 4.6 HOW DRUGS AFFECT CONSCIOUNESS

Drug Classification	Common Name	Main Effect
Depressants		
Alcohol	Beer, wine, spirits	Relaxation
Barbiturates (tranquilizers)	Nembutal, Seconal	
Stimulants		
Amphetamines	Methamphetamine, speed, Ritalin, Dexedrine	Stimulation, excitement
Cocaine	Cocaine, crack	
Nicotine	Tobacco	
Caffeine	Coffee, tea	
Narcotics		
Opiates	Morphine, heroin	Euphoria
Psychedelics and Hallucinogens		
	Marijuana, hashish, LSD, Ecstasy	Distorts consciousness, alters perception

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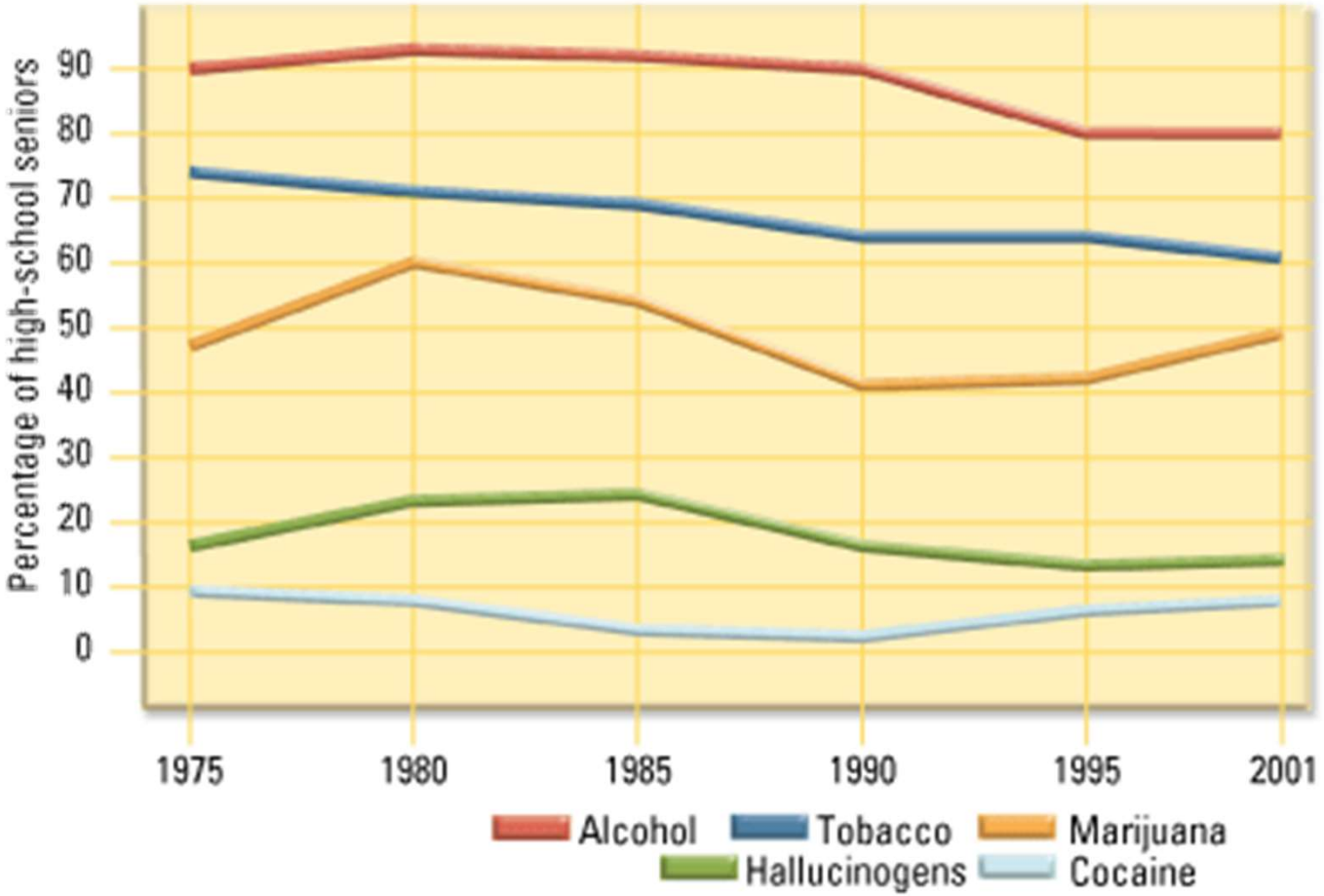
Percentage of high-school seniors
90
80
70
60
50
40
30
20
10
0
1975
1980
1985
1990
1995
2001
Alcohol
Tobacco
Marijuana
Hallucinogens
Cocaine

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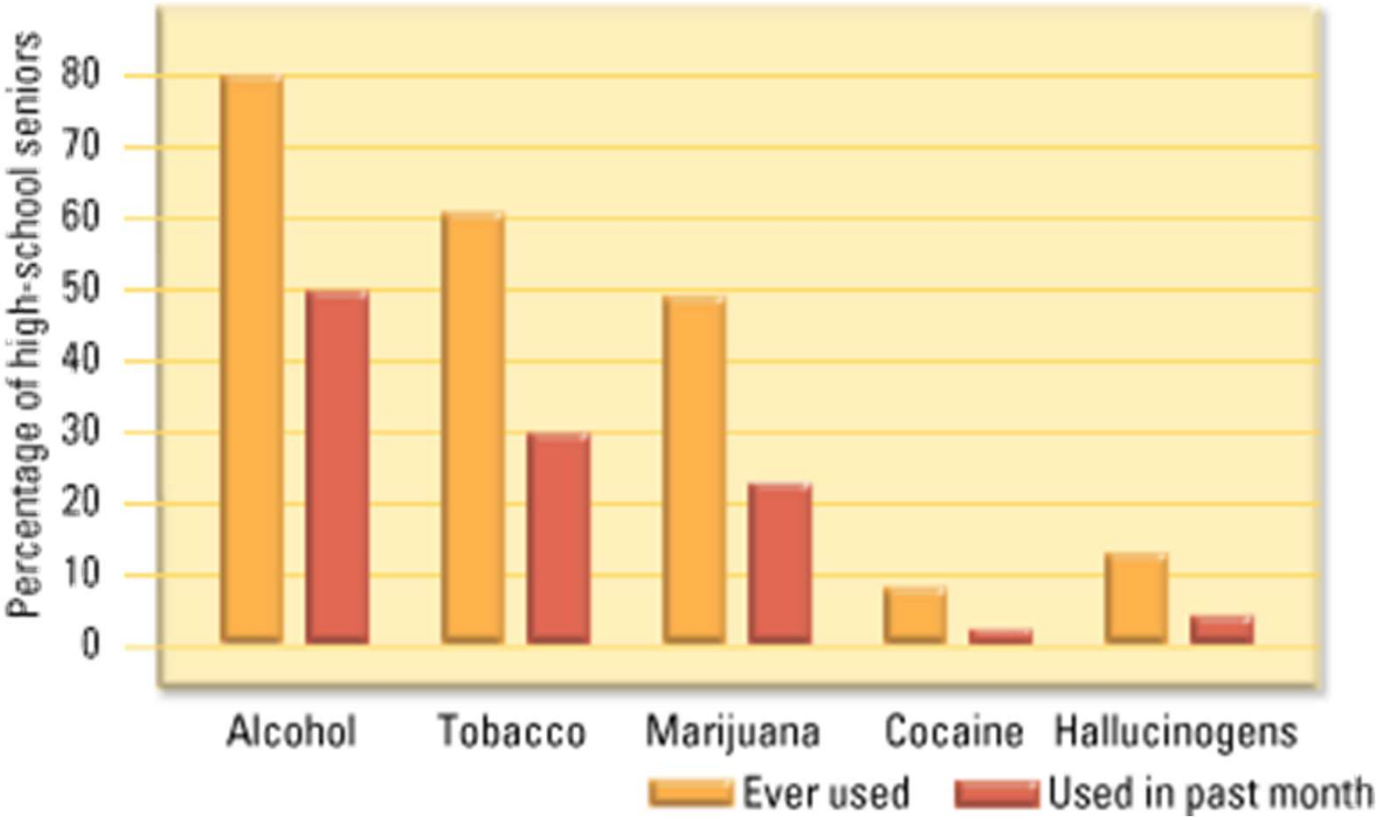
Percentage of high-school seniors
80
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10
0
Alcohol
Tobacco
Marijuana
Cocaine
Hallucinogens
Ever used
Used in past month

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